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30. An adhesive composition as claimed in claim 1 wherein the weight ratio of the zirconium crosslinking agent to the organic polymer is about 4:1.

31. An adhesive composition as claimed in claim 1 wherein the weight ratio of the zirconium crosslinking agent to the organic polymer is about 0.05:1 to about 2:1.

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32. An adhesive composition as claimed in claim 1 wherein the total solids content of the organic polymer and the zirconium compound crosslinking agent is kept in the range of about 0.01 to about 0.5 percent by weight based on the total weight of fiber in the fibrous web.

33. An adhesive composition as claimed in claim 1 wherein the total solid content of the organic polymer and the zirconium compound crosslinking agent is kept in the range of about 0.03 to about 0.2 percent by weight based on the total weight of fiber in the fibrous web.

REMARKS

In view of the foregoing amendments and the following remarks, Applicants respectfully request the reconsideration of this application and the timely allowance of all pending claims. Claims 1-5 and 26-33 are pending in the application. Claims 1-5 and 26-28 have been amended. Claims 29-33 have been newly added. No new matter has been introduced by this amendment. Entry of this amendment is respectfully requested. Applicants enclose a marked-up version of the specification as Appendix A and a marked-up version of the claims as Appendix B.

The specification has been amended to correct obvious typographical errors. No new matter has been added by these amendments.

Claims 29-33 have been newly added. Claims 29-33 further define and limit the invention described in claim 1. Support for the newly added claims can be found in the specification at pages 12-14. No new matter has been added by these amendments.

Claims 1-5 and 26-28 have been objected to under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as their invention. Applicants have amended claims 1-5 and 26-28 as requested by the Examiner and further to correct obvious typographical errors. In view of the foregoing amendments and remarks, Applicants respectfully request the reconsideration and withdrawal of the 35 U.S.C. § 112 rejection of claims 1-5 and 26-28.

Claims 1-3 and 26 have been rejected under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over, Kotani et al., U.S. Patent No. 5,700,560, or the related Kotani et al., U.S. Patent No. 5,969,029. According to the Examiner, the Kotani references disclose and exemplify compositions defined basically as containing (a) a high-hydrogen-bonding resin that includes polysaccharides such as chitosan, polyallylamine, chitin, etc., (b) a non-film-forming inorganic laminar compound, (c) a crosslinking agent for the hydrogen-bonding resin that includes zirconium compounds such as ammonium zirconium carbonate, etc., and (d) other conventional additives. According to the Examiner, the utility of the compositions in the Kotani references as a creping adhesive would be tenable because the compositions are essentially the same as and made in essentially the same manner as the claimed adhesive. Applicants respectfully traverse this rejection.

*Claim
30/317
See old
docs 12-13*

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Contrary to the Examiner's position, the utility of the compositions in the Kotani references as creping adhesives would not be tenable. The Kotani patents are directed towards a gas barrier resin composition and its film. Those compositions include as an integral part a non-film-forming inorganic laminar compound including non-film-forming clay minerals. See, e.g., col. 4, line 13. The use of such clay minerals, however, is severely counter-indicated for the production of a creping adhesive composition. Indeed, the presence of such a substance would not only destroy the utility of the composition as a creping adhesive, but it would also destroy the creping blade used in the paper-making process. Further, in the only examples of Kotani in which the zirconium crosslinking agent is used without the presence of a such a clay mineral, see Table 4, Comp. Exs. 21-24, Kotani et al. reported inferior water resistance and appearance, as well as extreme deformation of the film, see col. 15, lines 15-25. In addition, the temperatures used in the Kotani references are lower than those needed for a creping adhesive.

The compositions disclosed in the Kotani references therefore are not essentially the same as and made in the same manner as the claimed adhesive composition, contrary to the Examiner's contention. Because the composition disclosed in the Kotani references do not possess the characteristics of Applicants' claimed composition, *In re Best, Bolton, and Shaw*, 195 USPQ 430 (CCPA 1997), cited by the Examiner, is inapplicable.

For the same reasons, the Kotani references neither teach, disclose, nor make obvious the claimed adhesive composition. Further, a person of ordinary skill in the art would not, based on the disclosure of Kotani, have any reasonable expectation of

success that the composition disclosed therein could be used as a creping adhesive, as claimed by Applicants. Applicants therefore respectfully submit that the Examiner has failed to establish a prima facie case of obviousness.

Thus, Applicants respectfully submit that the Examiner has failed to establish that the claims are not allowable over Kotani et al. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 1-3 and 26 have also been rejected under 35 U.S.C. § 103(a) as being unpatentable over Hollenberg et al., U.S. Patent No. 5,246,544. According to the Examiner, Hollenberg et al. disclose creping adhesives containing a crosslinkable polymer which includes hydroxylated polymers and oligomers such as polysaccharides and polyvinyl alcohols, and a crosslinking agent, such as zirconium compounds having a valence of at least plus three. Hollenberg differs from Applicants' disclosure by the non-specificity relative to the disclosed polysaccharides. The Examiner states that one having ordinary skill in the art would have found it obvious to use as the disclosed polysaccharide species a species of the genus such as chitosan because the generic teaching necessarily implies that any species would have been operable within the scope of the invention disclosed in Hollenberg. This rejection is respectfully traversed.

Contrary to the Examiner's position, it would not have been obvious to modify Hollenberg as described by Applicants' disclosure. Hollenberg does not disclose polymers having amine-containing moieties. The Hollenberg reference instead discloses the use of polymers that can be crosslinked by ionic crosslinking. See col. 2, lines 14-16. Similarly, Hollenberg discloses the use of zirconium-containing compounds as crosslinking agents for ionic crosslinking. See col. 4, lines 41-45.

As described in Applicants' disclosure on page 7, the zirconium-containing compound is crosslinked with the amine-containing moiety of the organic polymer. The crosslinking is achieved by a Lewis acid/Lewis base reaction involving covalent bonds. It is not an ionic reaction, as disclosed in Hollenberg. Thus, contrary to the Examiner's position, it would not have been obvious to select an amine-containing polysaccharide with the crosslinking agent disclosed in the Hollenberg reference. There is no teaching or suggestion in Hollenberg that zirconium-containing compounds can be used to crosslink an amine-containing moiety, as disclosed by Applicants. As the Federal Circuit has made clear, "both the suggestion and the expectation of success must be founded in the prior art, not in applicant's disclosure." In re Dow, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). A person of ordinary skill in the art would not be motivated to select the amine-containing species claimed in the instant application from the broad disclosure of Hollenberg without the teachings contained in Applicants' disclosure.

Furthermore, as described in paragraph 6 of the Declaration of Phuong Van Luu dated February 2, 2000, previously submitted with the Preliminary Amendment, substitution of a polymer containing an amine group into the process of Hollenberg would render the composition unusable as a creping adhesive. Thus, modification of Hollenberg as suggested by the Examiner does not result in Applicants' claimed adhesive.

The Examiner has also rejected claims 1-5 and 26-28 under 35 U.S.C. § 103(a) as being unpatentable over Smigo et al., U.S. Patent No. 5,281,307, in combination with Hollenberg. Smigo discloses the use of a crosslinking agent which includes glyoxal, gluteraldehyde and others that are commonly employed for crosslinking polyvinyl

alcohol, in combination with a polyvinyl alcohol/vinyl amine copolymer as additives in a paper-making process. According to the Examiner, Hollenberg, which teaches the use of zirconium compounds as crosslinkers for hydroxylated polymers such as polyvinyl alcohol, provides ample motivation to employ a zirconium compound as the crosslinker for the polyvinyl alcohol component in the process of Smigo with a reasonable expectation of success. The Examiner further states that, while Smigo does not expressly recognize the use of the additive composition as modified as a creping adhesive, its utility as such is tenable. Applicants respectfully traverse this rejection.

Contrary to the Examiner's position, the use of a zirconium-containing crosslinking agent, as disclosed by Hollenberg, in the process of Smigo does not result in Applicants' claimed invention. First, the quantities of crosslinking agent disclosed in Smigo are too low to impart creping adhesive qualities to the composition claimed in Smigo. For example, compare col. 6, lines 17-20 and Examples 1-6 of Smigo, disclosing at most 50 weight percent of glyoxal as a crosslinking agent, with Table 8 on page 30 of Applicants' disclosure, showing that 100% to 200% glyoxal is necessary to achieve a creping adhesive composition which could then be compared with Applicants' claimed composition. Second, the use of a zirconium-containing crosslinking agent in the process of Smigo still does not result in Applicants' claimed invention. As described in the previously mentioned Rule 132 Declaration of Phuong Van Luu, mixing of the components of Applicants' claimed composition before application on the dryer surface-- where creping adhesives perform their function--as required by the process of Smigo for reducing fines in the paper-making process, does not result in the useful creping adhesive of Applicants' invention. Thus, the prior art contains no motivation or

suggestion to modify Smigo for use as a creping adhesive. Moreover, the modification of the composition of Smigo as suggested by the Examiner fails to result in the useful creping adhesive disclosed by Applicants.

Finally, Applicants respectfully direct the Examiner's attention to Table 8 on page 30, which compares glyoxal-crosslinked amine-containing creping adhesives with those crosslinked using an ammonium-containing crosslinking agent as disclosed by Applicants. In particular, Applicants draw the Examiner's attention to the results for stiffness and friction. As can be seen in the table, the compositions containing ammonium zirconium carbonate result in a soft product having low sidedness not achieved with the glyoxal-crosslinked compositions.

Clearly, not only is there no motivation in the prior art to combine Smigo and Hollenberg, but neither of the foregoing references alone or in combination teach, suggest, or make obvious the claimed invention, let alone that it would have a reasonable expectation of success. Applicants therefore respectfully submit that the Examiner has failed to establish a prima facie case of obviousness. Reconsideration and withdrawal of the 35 U.S.C. § 103 rejection of claims 1-5 and 26-28 and the timely allowance of all pending claims is thus respectfully requested.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

Dated: May 17, 2001

By: Kelly A. Casey
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APPENDIX A

Paragraph beginning on page 4, line 15:

U.S. Patent No. 5,246,544 describes a creping adhesive that provides the ability to control coating mechanical properties and adhesion, and which can be more easily removed from dryer surfaces. The adhesive system described in said patent provides high adhesion of a fibrous web to a dryer surface with low "friction". Having low friction means that the fibrous web can easily be removed from the dryer surface. Other references of interest include U.S. Patents 5,232,553 and 4,684,439. All the prior art patents are of interest but do not disclose polymers having at least one primary or secondary amine group in the backbone such as chitosan, polyvinylamine, polyvinyl alcohol-vinyl amine, polyaminoamide and etc., in combination with the zirconium crosslinking compounds having a valence of plus four such as ammonium zirconium carbonate, zirconium acetylacetonate, zirconium acetate, zirconium carbonate, zirconium sulfate, zirconium phosphate, potassium zirconium carbonate, zirconium sodium phosphate and sodium zirconium tartrate. In our process, the creping adhesive is formed on the Yankee surface wherein the carbon containing moiety of the zirconium crosslinking agent is exchanged with the amine moiety of the copolymer. The vinylamide copolymer also crosslinks with the cellulose moiety of the absorbent paper. These patents also do not relate to creping adhesives or the creping of tissue and towel from a Yankee dryer. U.S. Patents 5,374,334 and 5,382,323 relate to adhesives reacted with the crosslinking agent prior to establishing contact with the Yankee surface. In our novel process the crosslinking agents are charged to the Yankee

surface at the same time as the adhesive polymer wherein the adhesive of this invention is formed on the Yankee surface.

Paragraph beginning on page 12, line 9:

The various components of the adhesive formulation[,] may all be dissolved, dispersed, suspended, or emulsified in a liquid carrying fluid. It should be noted that the crosslinking agents in our process are sprayed directly on the Yankee surface with the base polymer. This liquid will generally be a non-toxic solvent such as water. The liquid component is usually present in an amount of 90 to 99% by weight of the total weight of the creping adhesive. The pH of the adhesive when it is applied to the desired surface in the papermaking operation will normally be about 7.5 to 11. The solvent preferably consists essentially or completely of water. If other types of solvents are added, they are generally added in small amounts.

Paragraph beginning on page 17, line 15:

Esthetics and tactile considerations are extremely important for tissue products as they often come into intimate contact with the most delicate parts of the body in use. Consequently, demand is quite high for products with improved tactile qualities, particularly softness. However, as tissue products are frequently used to avoid contact with that which the consumer would greatly prefer not to touch, softness alone is not sufficient; strength is also required. Merely providing a product with improved properties is not generally sufficient[,]; the "on the shelf" appearance of the product must suggest both strength and softness while consumers must be able to sense improvements by handling the packaged product. Appearance is critical; bulk, weight, compressibility,

firmness, texture and other qualities perceived as indicia of strength and softness are also required.

Paragraph beginning on page 19, line 9:

The following examples are illustrative of the present invention. It should be understood that the examples are not included to limit the invention and that various changes may be made by those skilled in the art without changing the essential characteristics and the basic concepts of the invention.

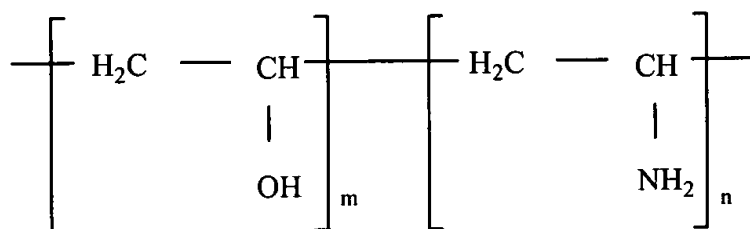
APPENDIX B

1. (Twice Amended) An [creping] adhesive composition comprising an organic polymer having in the polymer backbone amine groups selected from the group consisting of primary and secondary amine groups and mixtures thereof and a crosslinking agent for crosslinking the polymer to [the] a fibrous web, said agent being selected from zirconium compounds wherein the zirconium has a valence of plus four.

2. (Twice Amended) An adhesive composition as claimed in claim 1 characterized in that the organic polymer is selected from the group [selected from] consisting of chitosan[chiotsan], polyvinylamine, polyvinyl alcohol-vinyl amine and polyaminoamide.

3. (Once Amended) An adhesive composition as claimed in claim 1 or claim 2 characterized in that the crosslinking agent is a zirconium compound selected from the group consisting of ammonium zirconium carbonate, zirconium acetylacetonate, zirconium acetate, zirconium carbonate, zirconium sulfate, zirconium phosphate, potassium zirconium carbonate, zirconium sodium phosphate and sodium zirconium tartarate.

4. (Twice Amended) An adhesive composition as claimed in claim 3 characterized in that the organic polymer is selected from the group consisting of polyvinyl alcohol-vinyl amine copolymers of the following structure:

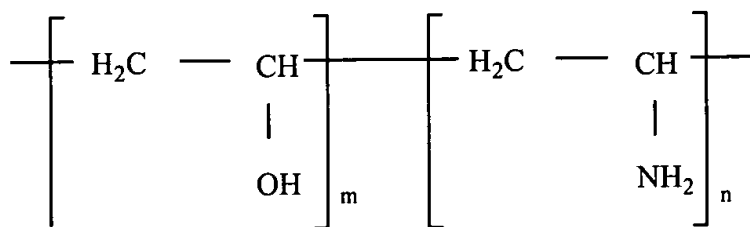


wherein m and n have values of 1 to 99 and 99 to 1 respectively.

5. (Once Amended) The [creping] adhesive composition of claim 4 wherein m and n have values of 1 to 99 and 2 to 20 respectively.

26. (Once Amended) The [creping] adhesive composition of claim 1 or claim 2 wherein the crosslinking agent is ammonium zirconium carbonate.

27. (Once Amended) An adhesive composition as claimed in claim 26 characterized in that the organic polymer is selected from the group consisting of polyvinyl alcohol-vinyl amine copolymers of the following structure:



wherein m and n have values of 1 to 99 and 99 to 1 respectively.

28. (Once Amended) The [creping] adhesive composition of claim 27 wherein m and n have values of 1 to 99 and 2 to 20 respectively.

29. An adhesive composition as claimed in claim 1 wherein the organic polymer is dissolved in water to create a solution, wherein the solution has a liquid component and a solid component and the liquid component is about 90 to about 99% by weight of said solution.

30. An adhesive composition as claimed in claim 1 wherein the weight ratio of the zirconium crosslinking agent to the organic polymer is about 4:1.

31. An adhesive composition as claimed in claim 1 wherein the weight ratio of the zirconium crosslinking agent to the organic polymer is about 0.05:1 to about 2:1.

32. An adhesive composition as claimed in claim 1 wherein the total solids content of the organic polymer and the zirconium compound crosslinking agent is kept in the range of about 0.01 to about 0.5 percent by weight based on the total weight of fiber in the fibrous web.

33. An adhesive composition as claimed in claim 1 wherein the total solids content of the organic polymer and the zirconium compound crosslinking agent is kept in the range of about 0.03 to about 0.2 percent by weight based on the total weight of fiber in the fibrous web.